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Hardware Installation 4

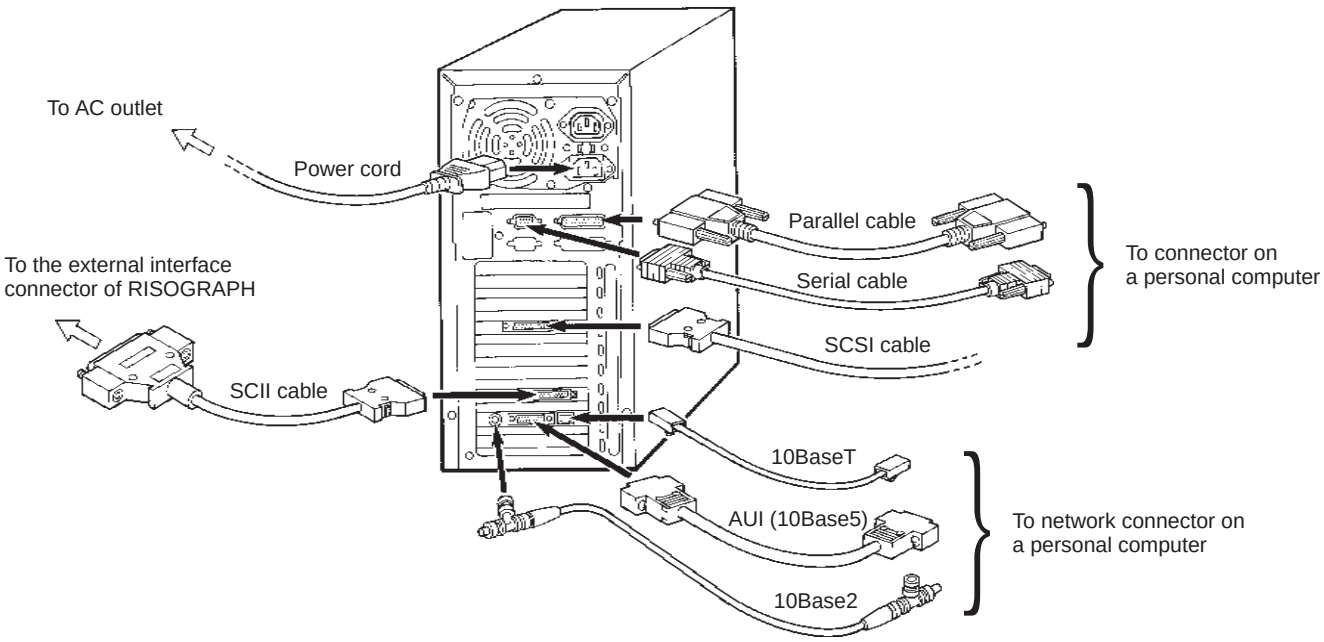
This section explains how to connect the SC7000 to one or more computers and to the RISOGRAPH.

The SC7000 offers three different interfaces for computer connection: Serial, parallel and network.

Essentially, they differ in the speed of data transfer, in the ability to send data back to the host (e.g. error messages) and in the distance which is allowed between the SC7000 and the computer. Their characteristics are discussed in the following paragraphs.

As a simple guideline, use the network port whenever possible. If there is no network use the parallel port. The serial port is the slowest solution but is available on almost any computer. Use the serial port if you cannot use the network port or parallel port.

Cable the SC7000 properly while referring to the figure shown below. Be sure to turn off the personal computer, SC7000, and printer when cabling.



* Use commercially available serial cable, SCSI cable and network cables.

Figure 4.1: Cable connections

4.1 Serial Port

The serial port (RS-232C) is available on almost any computer system.

The maximum data transfer rate supported by the SC7000 is 38400 bps which equals 38.4 KB/s. assuming one start bit and one stop bit. For reliable data transfer, the usable data transfer rate may be lower, depending on the host computer, cable length and cable quality.

The serial port allows bi-directional communication, i.e. a back-channel for status or error messages is provided from the SC7000 to the host computer.

The maximum cable length allowed for RS-232C ports is approximately 50 ft (15 m).

Some but not all serial port parameters of the SC7000 can be changed by means of the utility software described later in this manual. To establish serial communication with a host computer, set the computer's serial port to 8 data bits, 1 stop bit, no parity (sometimes abbreviated "8N1"). Make sure to set Baud Rate and Flow Control according to the settings of the SC7000. Factory defaults are 9600 baud and Xon/Xoff software handshake.

Please refer to the appendix for the pin assignment of the d-Sub 9-pin plug of the serial port.

Note that RS-232C serial port connectors of different devices may have different pin assignments. Always check the manual of your computer for the correct pin assignment. Make sure to use a cable which internally crosses the appropriate pairs of signal lines (TxD - RxD, DTR - DSR, RTS - CTS) as required. Computer vendors offer a variety of adapters which may help you to establish serial communication with your computer.

4.2 Parallel Port

The parallel port of the SC7000 complies to the IEEE 1284-A standard.

It includes the compatibility mode for backward compatibility to the standard PC parallel interface which is commonly known as “Centronics”. In compatibility mode the port transfers unidirectional data from the host computer to the SC7000. Therefore, no status or error messages can be displayed by the host computer.

The pin assignment of the d-Sub 25-pin receptacle of the parallel port is described in the appendix.

4.3 Network

The network port of the SC7000 supports Ethernet (IEEE 802.3). Ethernet is the most widely used Local Area Network (LAN).

Ethernet allows data transfer rates of up to 10 Mbps (1.25 MB/s), but this is just a theoretical limit. Network performance will be decreased by protocol overhead and by the current traffic on the network, depending on the number of stations. Additionally, the data transfer rate is reduced by hardware and software limitations of the connected devices.

Furthermore, print data is computed simultaneously while other print data is transferred. The transfer of data temporarily stops if it is faster than data generation, depending on computer hardware, application program and printer driver. To compare data transfer rates under different conditions, always print to a file and transfer the file by means of a downloader utility.

Estimating Ethernet data transfer rates under “real world” conditions, 100 KB/s is a good result. Using a downloader to transfer a print file directly, 200 KB/s is an excellent value.

The following paragraphs explain different options to set up a reliable Ethernet connection between the SC7000 and a computer network.

4.3.1 Ethernet Connectors

The SC7000 provides three Ethernet connectors for different kinds of physical Ethernet cabling. The network port of the SC7000 automatically senses which of the three connectors is currently used, but it is not allowed to connect more than one connector to a network at the same time.

4.3.1.1 10Base2

10Base2 is the Ethernet cable system which is also known as Thin Ethernet, Thinnet or Cheapernet. The BNC connector is used for 10Base2 connection.

Make sure that your cabling complies with the following rules for 10Base2 Ethernet:

The total length of an Ethernet cable segment may not exceed 607 ft (185 m), a maximum of 30 stations may be connected to it.

Each station, including the SC7000, is inserted into the Ethernet segment by means of a T-connector. The T-connector must be attached directly to the device, drop cables are not allowed.

The Ethernet segment consists of the stations, each one with a T-connector, which are joined together in a chain (bus topology) by cables of at least 1.7 ft (0.5 m) length.

The first and the last station in the chain need special attention: These two stations also use a T-connector, but a terminating resistor must be plugged into its free receptacle. Even the smallest possible network, consisting of two stations, requires two T-connectors and two terminating resistors.

For this reason, an Ethernet segment always has exactly two terminating resistors, one at each end. These resistors are crucial for reliable operation because they attenuate signal reflection. If an Ethernet segment is not terminated correctly, network performance is dramatically decreased or the network does not work at all.

4.3.1.2 10BaseT

10BaseT is an UTP (Unshielded Twisted Pair) Ethernet or Twisted Pair Ethernet because the cable consists of twisted wire pairs. The RJ-45 connector serves as the port for 10BaseT Ethernet.

Attention must be paid to the following rules for a reliable 10BaseT network cabling:

A 10BaseT network is configured in a star topology with a hub or concentrator in the center. Each station, including the SC7000, uses a drop cable from the station to the hub. The length of the drop cable is limited to 328 ft (100 m).

The drop cable consists of two wire pairs, one for transmitting and one for receiving data. Each of the four wires connects to the same RJ-45 connector pin at both ends of the drop cable.

The smallest possible 10BaseT network consists of only two stations. In this case, the hub may be replaced by a special cable which directly links the two stations. In case of a direct connection, the receive and transmit wire pairs must be crossed inside the cable. Therefore, a standard drop cable cannot be used.

4.3.1.3 AUI

The AUI (Attachment Unit Interface) connector is intended for 10Base5 Ethernet cable systems. 10Base5 is often called Thicknet or Thick Ethernet because it uses a “backbone” of thick and, in most cases, yellow cable. AUI uses the d-Sub 15-pin receptacle.

10Base5 Ethernet cabling must not exceed the following limits:

Stations connect to the backbone using a drop cable which may be up to 164 ft (50 m) long. The drop cable connects to the AUI of the station (e.g. the SC7000) and to a “transceiver” at the other end. The transceiver is connected to the yellow cable by means of a “vampire” tap which works as you would expect of the name.

The overall length of a segment of the yellow backbone cable is 1640 ft (500 m), a maximum of 100 transceivers may be connected to it. The minimum distance between each of the transceivers is 8.2 ft (2.5 m).

The use of the AUI connector is not limited to 10Base5 Ethernet cabling systems. Other transceivers(sometimes called mini transceivers, are available for connection to 10Base2 or 10BaseT cables. These transceivers may be directly plugged into the AUI port of the SC7000 even if this is not necessary because connectors for 10Base2 and 10BaseT are part of the SC7000 standard equipment.

4.3.2 Network Protocols

The SC7000 provides two different network protocols. These protocols are configured by means of utility software described later in this manual. Both protocols coexist on the same physical network at the same time.

4.3.2.1 EtherTalk

EtherTalk is the name of AppleTalk for Ethernet networks. It is the network of Apple Macintosh compatible computers, but other computer systems may also run EtherTalk using third party network software packages.

In the early days of Macintosh computers, the AppleTalk protocol was running on a network called LocalTalk. LocalTalk is considerably slower than EtherTalk because it uses slower hardware. Most newer Macintosh and Macintosh-compatible models (including Power Macintosh) are equipped with an Ethernet interface which allows connection to an EtherTalk network.

EtherTalk is “plug and play”, the network software is part of the Mac OS operating system. After connecting the SC7000 to the network as described above, it will appear in the Macintosh’s Chooser as a PS printer.

Nonetheless, the SC7000 utility software allows you to change two EtherTalk parameters:

The first parameter is the **Printer Name**, the name of the SC7000 displayed by the Chooser. The default name is SC7000. If there is more than one SC7000 in the network, the names are automatically extended by a number. The new names are SC70001, SC70002 and so on. The numbers depend on the order in which the devices are switched on.

To ensure consistent names for each of the SC7000, it is advisable to change the printer names in the manner of “SC7000 - 2nd floor” or “SC7000 - Sales Department”, for example. The length of a name may not exceed 32 characters.

The second parameter which may be changed by means of the utility software is the **AppleTalk Zone**. This parameter is only useful if your network is configured to have more than one logical AppleTalk zone in the same physical Ethernet segment.

In case of multiple AppleTalk zones in the physical network segment of the SC7000, you may want to select a logical zone in which the SC7000 resides. Enter the name of the logical AppleTalk Zone where you want the SC7000 to appear in the Chooser. If you leave the default zone as *, the Chooser will display the SC7000 in all logical zones which belong to the physical Ethernet segment of the SC7000.

Note that the AppleTalk zone must be physically located in the same Ethernet segment (the same cable) as the SC7000.

4.3.2.2 TCP/IP

TCP/IP is most widely used among UNIX workstations, but many other computer systems are capable of using TCP/IP as well. TCP/IP is not as easy to use as EtherTalk because it needs to be configured by somebody who has a detailed knowledge of the network.

The utility software which is described later in this manual is used for TCP/IP configuration of the SC7000. Two parameters must be selected.

It is most important to choose these parameters according to the requirements of the existing network. Always ask the person who is responsible for the network for the required parameters. Do not attempt to configure TCP/IP if you are in doubt about any of the parameters. If necessary, ask another knowledgeable person for help.

The first parameter, the **IP Address**, is a set of four numbers which must be unique for each device in the network.

The format of a valid IP address is N.N.N.N where each N is a decimal number in the range from 0 to 255, except one of the following: 0.0.0.0, 255.255.255.255, 127.N.N.N, N.N.N.0, N.N.N.255 or any IP address whose first field is in the range from 224 to 255 is invalid. The default IP address of the SC7000 is 128.1.0.64.

The second parameter which must be set is the **Netmask**. The format of a valid netmask is N.N.N.N where each N is a decimal number in the range from 0 to 255. The default netmask of the SC7000 is 255.255.0.0.

4.3.2.2.1 TCP/IP Workstation Setup

The SC7000 supports the lpr protocol for printing via TCP/IP. The SC7000 does not have a built-in spooler, queues for spooling must be established on the TCP/IP based workstation. Workstation setup may slightly differ on different UNIX systems. Basically, you need to edit the files **/etc/hosts** (or an equivalent system file) and **/etc/printcap** and to create the spool directory and error log file.

After choosing the IP address for the SC7000 which can be set by means of the utility software, add an appropriate entry to the file **/etc/hosts** of your UNIX workstation. As an example, add the following line when using the default IP address of the SC7000:

```
128.1.0.64 <tab> sc7000 <tab> #SC7000 default IP address
```

where <tab> denotes the tabulator character.

Add the following entries to the file **/etc/printcap**. These entries define the names of the SC7000 print queue, error log file, spool directory, remote host, and remote print queue as well as an unlimited file size for use by lpr:

```
sc7000:\
<tab> :lp:\
<tab> :lf=/usr/spool/sc7000/sc7000log:\
<tab> :sd=/usr/spool/sc7000:\
<tab> :rm=sc7000:\
<tab> :rp=ps:\
<tab> :mx=#0:
```

After editing **/etc/hosts** and **/etc/printcap**, create the spool directory and error log file:

```
cd /usr/spool
mkdir sc7000
chown daemon sc7000
cat /dev/null > sc7000/sc7000log
```

Finally, restart the printer daemon:

```
lpc restart sc7000
```

4.4 SCSI Port

The SCSI Port of the SC7000 is used for scanning only. The “scanner” consists of the SC7000 and a RISOGRAPH, connected to each other by means of the video cable which is also necessary for printing. Originals will be placed on the RISOGRAPH’s scanner platen.

The scanning feature must be supported by the RISOGRAPH model. If you are in doubt about your RISOGRAPH’s scanning capability, please ask your local RISO representative.

If an ADF (automatic document feeder) is installed, the ADF may also be used for scanning with the SC7000.

The complete scanner unit is connected to the host computer via the SCSI port of the SC7000. Therefore, the computer which is used for scanning must have a SCSI host adapter. An ASPI (Advanced SCSI Programming Interface) driver is required for Windows and MS-DOS. Please ask your RISO dealer for a list of supported host adapters.

Use a SCSI cable which fits into the 50-pin receptacle of the SC7000. This standard cable is available from most computer dealers. Please refer to the appendix for the SC7000 SCSI connector pin assignment.

TWAIN-compatible scanner drivers are provided for Apple Macintosh compatible computers and IBM-compatible PCs. Other computers cannot be used even if they have a SCSI port since there are no other SC7000 scanner drivers available.

For a reliable SCSI connection, make sure to connect the SC7000 to one end of the SCSI bus because the SC7000 SCSI port is always terminated.

Please refer to your computer’s or SCSI host adapter’s documentation for details about how to set up termination and termination power. Keep in mind that a SCSI bus must be terminated at both ends (and nowhere else).

Each device at the SCSI bus must have a unique SCSI ID. ID 7 is usually reserved for the computer’s SCSI host adapter, ID 0 for the computer’s hard disk. Check the SCSI IDs used by your computer system because they may be different and there may be additional devices connected to the SCSI bus, e.g. a CD-ROM drive.

The SCSI ID of the SC7000 is 5 by default. You may change the SC7000 SCSI ID by means of the SC7000 utility software.

4.5 RISOGRAPH

To connect the RISOGRAPH to the SC7000, the RISOGRAPH requires an optional built-in interface card and a specific firmware revision.

The interface card provides a connector for the video cable. The firmware or internal system software of the RISOGRAPH must have a revision number suitable for the SC7000.

Please ask your RISO dealer if you are unsure if your RISOGRAPH can be connected to the SC7000.

To connect the two devices, use the video cable which comes with the SC7000. The connectors at both ends of the cable are different, therefore they cannot be confused.

Do not forget to connect the main supply of the RISOGRAPH.

4.6 Mains Supply

Before attempting to connect the power supply of the SC7000, make sure to check the local supply voltage.

The SC7000 has a voltage switch at the rear side of the case, next to the mains supply inlet. It is most important to set the switch according to the supply voltage used.

Set the voltage switch to 110V if your nominal local voltage is in the range from 100V to 120V. Set the switch to 230V if your local voltage is in the range from 200V to 240V. If your local voltage is different from the ranges above, do not connect the SC7000 to the mains supply and ask your RISO dealer for advice.

If the voltage switch is not set to the correct voltage, the SC7000 may be damaged.

(Alimentation secteur)

(Avant de brancher le SC7000, vérifier la tension du secteur.

Le SC7000 comporte un commutateur de tension à l'arrière du boîtier près du connecteur d'alimentation. Il est essentiel que ce commutateur soit placé sur la position correspondant à la tension du secteur.

Placez le commutateur de tension sur 110 V si la tension nominale locale est de 100 à 120 V. Placez-le sur 230 V si la tension locale est de 200 à 240 V. Si la tension locale ne se trouve pas dans les plages ci-dessus, ne branchez pas le SC7000 au secteur et demandez conseil à votre revendeur RISO.

Si le commutateur de tension est réglé sur une tension incorrecte, le SC7000 risque d'être endommagé.)